APPENDIX C

Smart Card Demonstration Market Research

Appendix C: Smart Card Demonstration Project Market Research (Excerpt)

The following summarizes customer market research conducted for the Smart Card Demonstration Project, excerpted from the "Smart Card Demonstration Project, Final Report", dated June 16, 1997. This report is available from Candace Carlson, RFCS Project Manager, King County Metro Transit (206) 684-1562

C.1. CUSTOMER SURVEY

In mid-March 1997, a survey was administered to customers participating in the smart card prototype demonstration. The survey was comprised of three parts:

1. A general ridership information section to identify travel behavior and gage level of experience with the Prototype Demonstration equipment.

2. Questions to gather information on the respondents experience with the Prototype Demonstration equipment, primarily related to the fare payment process.

3. Questions to gather information for consideration in the Regional Fare Coordination System Design, primarily related to future payment and card revaluing options.

Approximately 90 surveys were mailed to participants in the Prototype Demonstration Project, and 52 returned, representing an overall return rate of 58%. Of the returns, 33 came from customers on the Pierce Transit (PT) Seattle Express service, while the remaining 19 came from customer on the King County Metro (KCM) Boeing Custom Bus Routes.

C.1.1 General Ridership Information

Respondents were asked how many one-way bus trips they made per week, and how many of these were on the smart card demonstration bus in order to assess their travel behavior, and gage their level of experience with the demonstration.

- Over 90% of the respondents (45 of 49 responses) were regular commuters making at least eight one-way weekday trips. Six respondents from PT also reported making 2 to 4 weekend trips. The average number of trips per week was 9.5, with a higher average for the PT respondents than for the KCM Custom Bus respondents.

- 77% of the respondents' bus rides (7.3 rides per week) were on a bus equipped with a smart card reader. Over the course of the 26 week demonstration, this would amount to an approximate total number of rides of 190 per respondent on buses equipped with the demonstration equipment

- Before the demonstration, all 52 respondents used a period pass to pay their transit fare, with one indicating that cash was also used with the pass.

C.1.2 Experiences with the Smart Card Demonstration

The second section of the survey was designed to determine the respondents' opinions on how well the smart card demonstration equipment worked, and to compare smart card fare collection with their conventional method of payment. A series of questions on convenience, usefulness and reliability relating to the smart card and the reader on the bus were included.

Results reflecting the full set of responses are summarized under each heading, followed by a brief discussion of any differences between the KCM and PT results. Given the limited sample size (52 survey responses), the percentages in the text have been rounded to the nearest 5% to reflect an appropriate level of precision.

C.1.2.1 Information Materials

Nearly all respondents felt that the information materials distributed at the beginning of the demonstration adequately explained the use of the card.

C.1.2.2 Smart Card Transaction Time

When asked to compare the smart card transaction time with the conventional period pass, most respondents indicated that that the time was the same or less. All respondents indicated that they previously used a period pass.

- Nearly 70% of the people felt that their transaction time had not changed with the smart card, around 25% felt that it decreased, and the remainder felt that it increased.

The opinions on this differed by agency. Pierce transit pass holders currently use a flash pass system. Most PT customers (90%) felt the smart card was as fast as their previous method of payment (flash pass).

KC Metro currently has a magnetic swipe pass system. About half of KCM respondents felt that the smart card system was faster than the swipe pass system. All but one of the remainder indicated it was about the same.

C.1.2.3 Smart Card Convenience

Almost all of the respondents thought that the smart card was at least as convenient as the period pass they used before the demonstration.

- 60% of the respondents thought that smart card fare payment was as convenient as the pass they use now.
- Nearly 35% found smart cards to be more convenient.
- The remainder (under 5%) found them less convenient.

PT responses were mostly neutral with a small number indicating more convenience, suggesting that overall PT customers felt the smart card was about as convenient as a flash pass.

Nearly three-quarters of the KCM respondents thought that smart cards were more convenient than the current magnetic swipe system. KCM customers noted that the card was very durable and that they could keep it in their badge holder. They found it easier to conduct the transaction with the contactless smart card than with a swipe pass.

C.1.2.4 Smart Card Transaction Reading/Processing

Respondents were asked to indicate their experiences with card reading/transaction processing onboard the bus. Overall, the card was read and the transaction processed on the first try about 95% of the time.

- When asked about the card read distance, about 80% of the respondents thought that the distance (2-3") was appropriate. About 20% thought it was too close.

- Asked to estimate how often their card had to be passed by the reader at least twice to register, about 65% of respondents indicated that they had to make additional card passes on five or fewer occasions (over the entire demonstration period). For this group of people, the card registered on the first pass at least 97% of the time.

- Just under 10% of the respondents had to make additional passes with their cards on more than 15 occasions. PT respondents tended to have to make additional passes with their cards more frequently than the KCM respondents. In the survey comments, a number of PT respondents noted that the readers were not always turned on.

- Over 75% of the respondents experienced one or more occasions where the card did not register. On average approximately 4 mis or non-reads per card were noted during the demonstration period, equating to approximately 2% of all transactions.

With regards to the last point, the card failure rate may be an overstatement of what would occur in a fully deployed environment because of the following:

- The fare tables in the smart card reader expired in early January, 1997, and took a few days to re-program. During this period the equipment was not operational.

- Some cards were intentionally set up as "invalid cards" to test the ability of the onboard equipment to identify them as such.

- During some runs, the smart card equipment was not turned on.

C.1.2.5 Smart Card Reader Display

Respondents were asked about the smart card reader display, which showed the amount of fare payment and the remaining number of days or rides on the card. More than half of the

respondents (about 60%) stated that they check the display, find it easy to read, and that the information on amount deducted and balance remaining on the smart card is useful.

- Frequency of checking (for those who checked the display) was evenly split between "sometimes" and "frequently."

- Nearly 40% of the respondents never checked the display. PT respondents checked the display less frequently than KCM respondents.

- When asked if they continued to check the display as the demonstration progressed, about 25% stated that they checked the display less frequently later in the demonstration than at the beginning. About 15% indicated the converse: that they checked the display more frequently at the end than at the beginning. The remainder indicated that they checked the display "about the same" or "don't know."

- Nearly 50% found the display easy to read, while over 25% had difficulty. Respondents on PT experienced more difficulty reading the display. Reasons cited included the height of the display and difficulty of reading from a standing position, and low contrast of the display.

- Over 50% thought that it was useful for the display to show the fare payment deducted, while 25% did not find it useful at all. On PT, there was an almost even split between responses on "useful" and "not useful". On KCM, most respondents thought this element of the display was either somewhat or very useful. Reasons for the difference in opinion were not clear.

- Over 60% found it useful to display the number of rides, value or days remaining, but almost 20% did not find it useful at all.

C.1.2.6 Smart Card Reader Audio Tone

The demonstration equipment included two audio tones indicating a "good" or "bad" transaction respectively. The majority of the respondents understood the tones and thought the volume was appropriate.

- With regard to understanding of the meaning of the tones, nearly 95% of the respondents understood the meaning of the tones that sounded.

- With regard to the appropriateness of the volume of the tone, the majority of respondents thought that the volume was about right. About 10% thought that tone was too loud, while less than 5% thought it was too quiet.

C.1.2.7 Smart Card Reader Colored lights

The smart card reader also had colored lights (red, yellow or green) that illuminated during transactions. Respondents were asked how well this worked and how useful the display was.

Most found the lights easy to see and useful, however not all respondents understood their meaning.

- Nearly one-quarter of the applicable responses indicated that the respondent did not or would not have understood a red or yellow light if displayed.
- Almost all of the respondents (that were sure of their response) though that the lights were easy to see.
- About 80% of the respondents indicated that the light display was useful. About 10% did not think it was useful.
- Nearly 70% of the people saw a red or yellow light (indicating a bad or incomplete transaction) at some time during the demonstration. About 10% could not remember whether they had seen a red or yellow light.

C.1.3 Information for a Possible Future System

Respondents were asked how they would use a smart card-based fare collection system if one were implemented by transportation agencies in the Central Puget Sound Region. A series of options were presented in several of these questions so that respondents could select or rank those options that interested them.

C.1.3.1 Common Regional Fare Medium

Asked about the importance of regional implementation of the smart card, 70% of the respondents felt that they would use a smart card on more than one transportation agency. Over 80% indicated that it was important to be able to use the card on any system in the region.

C.1.3.2 Smart Card Fare Payment Options

Given the smart card fare payment options of monthly pass, stored ride and stored value, most respondents indicated that they would use the monthly pass option on the smart card, but a significant number of the respondents also expected to use stored value or stored rides on the smart card.

- All respondents except one had indicated that they currently only use a monthly pass. When asked how they might use a smart card in the future, 40% indicated they would select a monthly pass plus stored value, stored rides or both. About 50% indicated that they would continue to use the card as a monthly pass only.
- A few respondents (about 10%) indicated that they would choose stored value instead of a monthly pass. The reasons for this are not clear, but it was noted that these respondents made ten or fewer one-way trips per week..

C.1.3.3 Value Loaded onto Smart Cards

Respondents were asked how much value (made up of any combination of pass, stored value and rides) they would be comfortable loading onto their smart card each month.

- 65% responded with a value in the range of $61-80.
- Over 20% responded that they would be comfortable loading at least $80 onto the card.

C.1.3.4 Issues Related to Smart Card Revaluing

Additional questions about issues related to smart card revaluing were asked including:

- revaluing locations;
- methods of payment;
- card balance checking;
- the possibility of protecting the value of the card against loss or theft by having it registered.

The questions about revaluing and balance checking locations asked that a ranking be provided. Some respondents did this for all options, while others only ranked the two or three that appealed to them.

C.1.3.4.1 Revaluing Locations

It was explained to customers that smart cards would periodically need be revalued by adding stored value, stored rides or new period pass expiration. Out of seven suggested card revalue locations, three emerged as clear favorites:

- at the place of employment;
- at Automated Teller Machines (ATMs);
- at retail outlets.

KCM respondents overwhelmingly identified the place of employment as the most convenient. These respondents are Boeing Custom Bus riders who currently purchase passes at the work site through payroll deduction. PT respondents selected ATMs, closely followed by retail outlets and the place of employment.

Other preferred locations included on-board revaluing (prepaid by phone, mail or computer), transit or ferry terminals, and Customer Service Offices (CSOs).

C.1.3.4.2 *Methods of Payment*

Respondents were asked which methods (one or more) they would use to pay for the value loaded onto the smart card:

- the top two options, by check and by payroll deduction, were selected by over 50% of the respondents.

- credit cards were selected by about 25% of the respondents. Other options (cash, debit card, and automatic deduction) were each selected by 20% of the respondents.

PT respondents showed a strong preference for the check option, while the KCM respondents showed a very strong preference for payroll deductions to pay for smart card value. As noted previously, all KCM respondents were Boeing employees that currently purchase fare media at work through payroll deduction.

C.1.3.4.3 Card Balance Checking

Respondents will need to keep track of the remaining balance (stored value, stored rides, or days left on a period pass) on the smart card. Nine options were presented and the respondents were asked to rank them for convenience:

- The onboard display on the smart card reader was identified as the most convenient location (75%).

- Other options that were rated most convenient by at least one person included Park and Ride lots (70%), ATMs (60%) and value checkers (45%) placed elsewhere on the bus.

C.1.3.4.4 Registering a Smart Card

The survey form explained that the value on a lost or stolen card could be reinstated on a new card, if the smart card were registered with a transportation agency. Almost all of the responses indicated interest in this benefit.

C.2. CUSTOMER FOCUS GROUPS

This qualitative study was undertaken to discuss directly with representative customers interest in, and needs and preferences for a smart card fare collection system. Specific discussion items included:

A. Customer understanding and overall evaluation of a possible smart card system.

B. Reactions to specific elements of the system, including:

1. An initial fee to obtain the card
2. The location of valuing/revaluing stations
3. Options for valuing/revaluing the card
4. The possibility of allowing third-party advertising on the card
5. The possible use of cash values for purposes other than transit fares

C. Reactions to 4 possible incentive plans

C.2.1 Research Design

Three 90-minute focus groups were conducted with a total of 29 transit and/or ferry riders:

Area	*Interviewing Location*	*Date/Time*	*Number of Participants*
North	Community Transit Offices *Lynnwood*	Tues, 4/8 6:30	11
Central	WA State Ferries Offices *Seattle*	Wed, 4/9 6:30	10
South	Pierce Transit Offices *Tacoma*	Thurs, 4/10 6:30	8

C.2.1.1 Recruiting

A variety of sources and methods were employed to recruit participants, including: Notices on buses, citizen's advisory committees, telephone recruitment from an earlier Metro Rider/Non-Rider survey with respondents who indicated a willingness to participate in further research, respondents from a smart card on-board demo survey, and contacts with selected regular riders known to be interested in participating in such research. All were screened and recruited by members of the transit services involved. Focus group participants were paid an honorarium of $40.

Riders from all participating systems were represented among the participants. In each interviewing area, one type of transit rider was most often encountered:

- *North:* Community Transit -- Mostly Community/Metro combo pass commuters
- *Central*: WA State Ferries – Mostly Metro, with some Ferry/Kitsap Transit connections
- *South:* Pierce Transit – Mostly Seattle Express commuters (7 of 8 having been exposed earlier to the smart card demonstration equipment)

C.2.1.2 Stimulus Materials

The smart card fare system was initially defined and represented by a two-page concept statement created expressly for this research. This statement was not intended as a plan or even a proposal endorsed by the Regional Planning team. Rather, the statement was designed only to elicit responses from the customers to subjects of interest. So, for example, the statement indicated a $5 initial fee would be charged for the card in order to learn how customers felt about such a concept, while no decision has been made at this time about initial fees. (The purpose of the fee was to help customers understand that the card is to be re-used for several years, rather than to be disposed of indiscriminately.)

Similarly, fare structures and policies were separated from smart card operations and procedures. Participants were told that they could do anything with the card they now do (use it to store passes, or "cash"), and that there would be no impact on fare structures due to the implementation of the smart card system.

C.2.1.3 Discussion

Each focus group lasted approximately 90 minutes and followed a pre-planned discussion guide with approximate times as outlined below.

1. Introduction/background/discussion guidelines (:10)
2. Presentation of smart card concept statement (:05)
3. Initial questionnaire reactions to smart card concept (:05)
4. Discussion of initial reactions to concept (:20)
5. Perceived affect on transit behavior (:05)
6. Discussion of selected issues surrounding the system (:20)
7. Reactions to 4 possible incentives to use the card (:10)
8. Individual evaluation of the system and rationale (:15)

Each group was moderated by Larry Noedel, audio-tape recorded, and observed by two or more representatives of the Central Puget Sound Regional Fare Coordination Project.

C.2.2 SUMMARY OF FINDINGS

- The overall reaction to the smart card concept was very positive. Initial ten-point scale mean ratings were favorable, at 7.3, with 60% of the participants rating the appeal of the system an "8" or higher. The discussion was animated and upbeat with little evidence of any serious anxieties about the use of this new technology. At the conclusion of the sessions nearly all participants rated the system "very good," reserving the "excellent" rating until they have successful experience with the actual system. 86% said they would obtain a smart card if the system were introduced tomorrow. 7-in-10 said they would obtain a smart card and store some cash on it.

- The initial concept statement was perfectly clear to most participants. However, a minority was unclear about some specifics, such as the possibility of storing multiple fare media on a single card, that there was no time limit on spending stored value, and that the stored value on a card could be used to pay for the fares of others.

- In general, the strength of the participants' reactions depended on how well the system fit their own personal transit habits. Those with very simple, straightforward needs were less likely to associate strong benefits with the concept than those using multiple systems or those having more complex needs.

- The single most important perceived advantage of the concept was that it "worked across all transit systems." Nearly as many appreciated the idea that they could "recover the value in a lost or stolen card." Other strengths included that the customer wouldn't need to carry cash or have the right change, and that there would be lots of places to revalue their cards.

- While most saw no serious disadvantages, those who did focused their concerns in three areas. First, the possible difficulties and inconveniences that may be associated with malfunctions. Second, the suggested initial $5 fee for obtaining the card. Third, the combination of the inability to prevent value from being used if an anonymous card was lost or stolen along with privacy concerns resulting from providing agencies with their name and address in order to obtain a "linked" card.

- Attitudes toward the incentives varied somewhat by the participants' ability to take advantage of them. The simplest, a) the 5% bonus on stored value purchases, and b) a free ride after ten paid rides, were strongest overall. However, the idea of providing bonuses or incentives of any sort was appealing to most, so some rated highly even those incentives they didn't expect to use.

- Third-party advertising on the card was acceptable to most as long the benefit was clearly seen as going to the customer, specifically to cover the initial fee to obtain the card. Considerable interest was expressed in using stored value for transit-related expenditures, but many were strongly resistant the idea of broader retail use, fearing they would be tempted to spend money reserved for transportation on less essential items.

C.2.3 IMPLICATIONS

As presented, the smart card fare system was well accepted, even though some admitted that they came to the discussions prepared to resist the idea based on their prior beliefs about the system. By preserving current fare media options and adding new benefits, the system was quite sufficient to overcome these pre-existing customer objections. This underscores the importance of keeping fare structure and policy issues separate from the introduction of any smart card system.

Even more encouraging, the specific benefits and advantages seen by the customers were precisely those that the Regional Fare Project sought to provide. Still, there are some remaining issues to be considered:

- *Communications*. Descriptions of the workings of the system can be sharpened. The better the system can be explained, the fewer problems will be encountered.

- *Initial Fees*. The majority would accept an initial fee of $5. However, a vocal minority would complain quite strongly. And, there is the issue of multiple cards in the same family. One possible solution, accepted by most who objected to an initial $5 fee, is a $5 refundable deposit.

- *Linked Cards*. The majority of participants reported that they would provide the information necessary to obtain a linked card (name and address), and a minority said they would not. Some suggested "anonymous linkage" via serial numbers or passwords. There may not be any practical way to satisfy every customer on this issue. However, this shouldn't be a big problem as long as the anonymous cards are available for those who desire them.

- *Revaluing locations*. For many, the perceived convenience of the smart card system depends on the extent of the revaluing network. Participants considered the ideal solution to be telephone revaluing or other revaluing options that they could undertake from home or work.

- *Advertising*. Customers appear quite willing to accept third-party advertising if they believe the revenue generated directly benefits them. However, even if true, this would be difficult to communicate under marketplace conditions.

As favorable as these results are, they must all be understood within the context of the customers' willingness to assume that the system will work as well as promised. In the real world, of course, the system will be evaluated in terms of how well it works, not how well it is described.

C.2.4 DETAILED FINDINGS

C.2.4.1 Comprehension

- In general, participants clearly understood the ideas and procedures presented in the concept statement. At each interviewing location a clear majority said that they "understood perfectly" what they system was and how it worked. The minority said

they "generally understood the system," but were unclear about some specific detail. The most important of those issues or misunderstandings included:

- That it was possible to store multiple fare media on the same card (for example, both a pass and cash) rather than having to choose only one.
- That a smart card owner could use the cash value on his card to pay the fares of others traveling with him. For example, that it would be possible to use one card for all the members of a traveling family.
- That there would be no way for large employers to provide pre-valued smart cards to their employees and therefore the system would be less convenient than the current where such employers simply provide employees with a monthly pass (erroneous).
- Confusion about why it would be necessary to have different cards for autos and passengers on the ferries.
- Whether there was any time limit on cash values stored on the card.
- Whether it would continue to be possible to pay by cash rather than use cash value stored on the card.
- How transfers would work.

C.2.4.2 Overall Evaluations of the System

- Immediately after reading the concept statement, 6-in-10 of the participants rated the system an "8" or better, resulting in a mean rating of 7.3.

Initial Appeal of Smart Card System (10-point scale)	North	Central	South	**Total**
Bases:	(11)	(10)	(8)	**(29)**
	#	#	#	**# %**
1-3	1	1	1	3 10%
4-7	2	4	2	8 28%
8-10	8	5	5	18 62%
Mean	7.6	7.0	7.4	7.3

- Most frequently, the system was immediately characterized as "promising" and to have "potential." Some withheld evaluation at this point, summarizing their reactions as "unsure." Only a couple were negative, and said the system was "expensive," "unnecessary" or "scary."

- A few indicated that they came to the discussion prepared to be negative about smart cards, but were not after they learned about the system, particularly because it preserved the fare options they currently employed.

- At the conclusion of the discussion, participants were asked to again rate the system on the basis of a verbal scale as "excellent, very good, good, fair, poor." All but a couple rated the system "very good," and went on to explain that they couldn't rate it as "excellent" until they saw it in action. So, they gave the ideas in the concept statement the highest possible ratings they felt they could without having real experience with the system.

C.2.4.3 Perceived Advantages

- The single advantage expressed most often, by about half, was that "It works across all (transit) systems." As would be expected, those using multiple systems cited this advantage most frequently. The ability to "recover the value of a lost card" was mentioned by 4-in-10. That it "isn't necessary to carry cash was stated by nearly 3-in-10. The complete list of advantages follows:

C.2.4.3.1.1.1.1 Most important Advantages *(Up to 3)*	North	Central	South	**Total**	
Bases:	(11)	(10)	(8)	**(29)**	
	#	#	#	**#**	**%**
Works across all systems	6	2	6	14	49%
Can recover the value of lost card	2	8	2	12	41%
Don't need to carry cash	3	1	4	8	28%
More places to purchase/revalue	1	3	1	5	17%
Don't need correct change	3	--	1	4	14%
Ease of use	1	3	--	4	14%
Store more than 1 month/no time limit	2	1	--	3	10%
Ease of payment	2	--	1	3	10%
Durability of card/reuse same card	1	1	1	3	10%
Allow others to use/one card per family	2	--	--	2	7%
Faster loading/unloading of vehicle	1	--	1	2	7%
Convenience	--	2	--	2	7%
Future phone revaluing	--	1	1	2	7%
Record of transactions	1	--	--	1	3%
Flexibility	1	--	--	1	3%
No need to write checks	1	--	--	1	3%
Vending purchases	--	1	--	1	3%
Works just like my pass	--	1	--	1	3%
Payment options	--	1	--	1	3%
You make the cash decisions	--	--	1	1	3%

C.2.4.4 Perceived Disadvantages

- The disadvantages were more fragmented. The suggested "$5 initial fee" was mentioned by 1-in-5, as was "delays or problems caused by electronic problems or errors." The "inability to stop theft usage" was mentioned nearly as often. The "inability to see the value on a card" and the "lack of security of personal information" were mentioned by about 1-in-10. The complete list follows:

Most Important Disadvantages (Up to 3)	North	Central	South	**Total**	
Bases:	(11)	(10)	(8)	**(29)**	
	#	#	#	**#**	**%**
$5.00 initial cost of card	1	4	1	6	21%
Possible errors/electronic problems/delay	--	3	3	6	21%
Inability to stop theft usage	3	--	2	5	17%
Lack of security of personal information	2	2	--	4	14%
Inability to "read"/see value on card	2	--	1	3	10%
24-hour delay if lost	--	2	--	2	7%
Defective cards will be a hassle	--	1	1	2	7%
No renewal by phone/mail	1	--	--	1	3%
Have to pay in advance	1	--	--	1	3%
No more paper passes/tickets	1	--	--	1	3%
Can't be used on ferries (erroneous)	1	--	--	1	3%
Won't help a "new" person	--	1	--	1	3%
No photo ID	--	1	--	1	3%
Easy to lose	--	--	1	1	3%
Lines to obtain a waste of time	--	--	1	1	3%
Concern with security at vending location	--	--	1	1	3%
Higher monthly cost	--	--	1	1	3%
May need to recharge before end of month	--	--	1	1	3%
Doing away with cash (erroneous)	--	--	1	1	3%
Doubt 5-year durability	--	--	1	1	3%
Slows loading	--	--	1	1	3%
Will increase fare costs	--	--	1	1	3%
$5 replacement cost	--	--	1	1	3%
Inability to "cash-out" (erroneous)	--	--	1	1	3%
None	2	1	1	4	14%

C.2.4.5 Perceived Impact on Behavior

- All-in-all, the smart card system was perceived to have little impact on fare paying behavior. If the system described was introduced tomorrow, 86% said they would

obtain a smart card. A couple would assess their needs a month in advance and adjust their use of passes and stored value to their advantage. Nevertheless, the overwhelming majority of riders would use the smart card to emulate the same type of fare payment they use now.

The most important change would be that more would have cash available for transit via the smart card system. Some would keep the cash on the card for "emergency purposes" and other to have fare money to use opportunistically, for a casual ferry ride for example.

C.2.4.5.1.1.1.1 Perceived Impacts on Behavior	North	Central	South	**Total**	
Bases:	(11)	(10)	(8)	**(29)**	
	#	#	#	**#**	**%**
What I do now:					
Use only cash for transit	2	3	--	5	17%
Use only passes/tickets	1	6	7	14	49%
Use a combination of cash/passes/tickets	8	1	1	10	34%
If Introduced Tomorrow, Most likely I:					
Wouldn't get a smart card	2	2	--	4	14%
Would get a smart card and store:					
Only cash (value)	3	1	--	4	14%
Only passes/tickets	3	2	6	11	38%
Combination of cash/passes/tickets	3	5	2	10	34%

C.2.4.6 **Revaluing Locations/Payments**

- The precise extent of revaluing stations was quite important to some, who felt it was difficult to determine the extent of the network from the information presented. Of course, all would agree that the more locations, the better.

- Among the options presented, stores and merchants were the most popular, thought to be the likely places at which just over half would revalue their cards. Several were strongly in favor of the idea of telephone re-valuing, thinking that would be the most convenient option, and a couple suggested that the Internet should also be used. ATMs were spontaneously mentioned by quite a few as a very convenient location.

- Some were concerned that multiple machines be placed in high volume locations to reduce standing in line. A couple expressed concern over personal safety and security at unattended vending machines.

C.2.4.6.1.1.1.1 Revaluing/Payment	North	Central	South	**Total**
Bases:	(11)	(10)	(8)	**(29)**
	#	#	#	**# %**
Most Likely Setup/Revalue At:				
Customer Service office	--	1	1	2 7%
Fare vending machines	4	3	1	8 28%
Selected stores and merchants	6	4	6	16 55%
Wouldn't get a smart card	1	2	--	3 10%
Most Likely Method of Payment:				
Cash	2	2	1	5 17%
Check	3	3	5	11 37%
Credit card	3	--	--	3 10%
Debit card	1	2	1	4 13%
Pre-authorized debit	--	--	--	-- --
Employer pay by electronic transfer	2	1	1	4 13%
I wouldn't get a smart card	1	2	--	3 10%

- About 7-in-10 said they would obtain a smart card and store some cash on it. The average maximum amount to be stored was $35 and the average minimum amount $7.

C.2.4.6.1.1.1.2 Estimated Levels of Stored Value	North	Central	South	**Total**
Bases:	(11)	(10)	(8)	**(29)**
	#	#	#	**# %**
Levels of Stored Value Expected:				
Maximum Amounts				
High	$70	$50	$80	$80
Low	$20	$5	$20	$5
Average	$34	$24	$50	$35
Minimum Amounts				
High	$10	$20	$50	$50
Low	$1	-0-	-0-	-0-
Average	$7	$9	$12	$7
Wouldn't store cash	2	4	3	9 31%

C.2.4.7 Initial Fee

- The majority of participants easily accepted the idea of a $5 initial fee. However, among a minority, this subject generated some of the strongest negative reactions of any issue discussed.

- Many reasoned that the smart card system was being instituted entirely or primarily for the benefit of the transit companies. Therefore, the transit companies should pay for the system rather than charge the customer any fees. This perspective was held most strongly by those who rode only one system or those who paid only cash fares.

- A couple did voice concern about the costs to larger families. For example, one participant with two children pointed out that she would have to purchase three smart cards under the new system. Many identified with the idea of requiring something of value to make sure the cards were not wasted.

- Among the alternative suggestions were to make the initial requirement a $5 refundable deposit, or give the first card away for nothing and make customer's pay for second or additional cards. Either idea seemed to be acceptable to those who objected to the initial fee.

C.2.4.8 Anonymous vs. Linked Cards

- There was considerable discussion about linked cards. The majority indicated they would obtain a linked card. However, the minority was quite concerned about linked cards. They appreciated and would like to have the benefits of a linked card, but not at the price of providing "personal information" to the transit companies. This concern was centered on a generalized fear of "big brother" and was not specifically focused on the transit companies.

- Some expressed interest in the idea of an "anonymous linkage" through the use of serial numbers or passwords. This, they reasoned, would allow them to be able to gain the benefits of a linked card without the risks they saw in providing the required identification information.

C.2.4.9 Low key ads

- No one objected to the idea of advertising on cards as long as it was seen as directly benefiting the customers. Specifically most felt any advertising should completely cover the initial cost of the card, relieving the customer of the $5 charge.

C.2.4.10 Transit cash

- Most all would support the idea of using the cash value on the card for "transit related" expenditures (like food on the ferries), but only a few would support broader use for the cash values. Many wanted to be sure that they couldn't spend their transit reserve on less essential items.

C.2.4.11 Incentives

- While all agreed that they would most strongly value those systems that most benefited their usual transit behavior, the simpler ideas of a 5% bonus on stored value purchases, or get a free trip after ten paid trips scored best. Several agreed that it would be the convenience of the system and not the incentives that would cause them to use it. However, many also suggested that the idea of some bonuses or incentives for heavier use seemed "fair and proper" to them.

C.2.4.11.1.1.1.1 Ratings of Incentives	North	Central	South	**Total**	
Bases:	(11)	(11)	(10)	**(29)**	
	#	#	#	**#**	**%**
C.2.4.11.1.1.1.2 Appeal of 5% Bonus on Stored Value					
1-3	--	1	--	1	3%
4-7	3	2	2	7	24%
8-10	8	6	4	18	63%
DK	--	1	2	3	10%
Mean	8.5	7.7	8.0	8.1	
C.2.4.11.1.1.1.3 Take 10 Trips Get Next Free					
1-3	3	1	--	4	14%
4-7	4	--	2	6	21%
8-10	4	8	4	16	55%
DK	--	1	2	3	10%
Mean	7.5	8.7	8.3	8.1	
10% Off Each Fare for Transfers					
1-3	3	2	--	5	17%
4-7	4	2	1	7	24%
8-10	4	5	6	14	49%
DK	--	1	1	3	10%
Mean	5.8	6.8	8.5	6.8	
20% Off Passes for 2 or More					
1-3	5	1	--	6	21%
4-7	1	1	1	3	10%
8-10	5	7	6	18	62%
DK	--	1	1	2	7%
Mean	5.4	8.6	8.6	7.3	
C.2.4.11.1.1.1.4 Incentive Rated Most Appealing					
5% Bonus on Stored Value	7	1	2	10	34%
Take 10 Trips Get Next Free	2	6	--	8	28%
10% Off Each Fare For Transfers	1	--	1	2	7%
20% Off Passes for 2 or More	1	2	2	5	17%
DK	--	1	3	4	14%

C.2.4.11.1.1.1.1 Ratings of Incentives	North	Central	South	**Total**	
Bases:	(11)	(11)	(10)	**(29)**	
	#	#	#	**#**	**%**
Incentive Rated <u>Least</u> Appealing					
5% Bonus on Stored Value	--	2	3	5	17%
Take 10 Trips Get Next Free	1	--	1	2	7%
10% Off Each Fare For Transfers	3	3	--	6	21%
20% Off Passes for 2 or More	7	2	2	11	38%
DK	--	3	2	5	17%

C.3. DRIVER FOCUS GROUPS

This Section summarizes findings the driver focus groups. Three primary topics were covered:

1. Driver reaction to the concept of smart card fare collection system based on a concept description of how the system might operate in the region, and from direct experience with the prototype demonstration.

2. Driver perception of customer reactions to a smart card fare collection system

3. Discussion of issues for consideration in the Regional Fare Coordination System Design Project.

C.3.1 Research Design

C.3.1.1 Focus Group Locations

Two focus groups covering the north/central and south regions were held on April 16 and April 22, 1997 respectively, and were attended by 18 drivers from Kitsap, Everett, KC Metro and Pierce Transit.

Group	*Date*	*Location*	*Participants*
North/Central Region	April 16, 1997	Metro East Base	• 1 Kitsap Transit driver • 2 Everett Transit drivers • 6 KC Metro Transit drivers
South Region	April 22, 1997	Metro South Base	• 5 KC Metro Transit drivers • 4 Pierce Transit drivers

All KC Metro and Pierce Transit drivers had some experience with using the smart card demonstration equipment in revenue service. The Kitsap Transit driver had been exposed to the equipment through operation (non-revenue service) of a portable version of the same devices as installed on the coaches. The Everett Transit drivers had been apprised of the project, but had no direct experience with the Smart Card Demonstration equipment.

C.3.1.2 Methodology

The approach followed for the driver focus groups was based on methodology developed for the customer focus groups. It included eight major activities:

1. Introduction of attendees, including the moderator (Paul Lavallée of IBI Group), participants, and observers from the transit agencies.
2. Presentation of an overall concept describing how a smart card fare collection system might operate.

3. Completion of a questionnaire by the drivers to identify their initial reactions to the smart card concept.
4. Discussion of the concept.
5. Discussion of driver experiences with the demonstration equipment.
6. Discussion of customer perceptions of a smart card system.
7. Discussion of issues for consideration in the Regional Fare Coordination System project.
8. Closing discussions and summary reactions.

C.3.2 Driver Reactions

The first part of each focus group focused on discussing the smart card system concept and experiences with the demonstration in terms of overall appeal of the system, advantages, and disadvantages. The list of advantages and disadvantages was maintained and updated throughout each session.

C.3.2.1 Overall Reaction

Drivers were asked to provide an overall rating of how appealing the smart card system was to them on the scale from 1 (low appeal) to 10 (high appeal). The north/central group provided an overall rating of 6.8, with the south group providing an overall rating of 8.4, for an average rating of 7.6. This indicates that both groups of drivers viewed the system very positively.

Overall Reaction to Smart Card System

	Number of Drivers Responding		
Ranking	***North/Central Group***	***South Group***	***Total***
1 (low appeal)			
2			
3			
4	1		1
5	1		1
6	2		2
7	2	3	5
8	2	1	3
9		3	3
10 (high appeal)	1	2	3

Two of the drivers in the north/central group who provided an average to low rating (6 and 4 respectively), did so because in their view the system was “best suited to only the commuter market.” Upon further inquiry, one of these drivers (the one who ranked it a 4) indicated that he

would rank it a 9 for commuters and 2 for others. As well, the south group drivers (all of whom had experience with the demonstration) gave a higher overall rating with no ranking below 7.

C.3.2.2 Advantages and Disadvantages

Drivers were asked to cite advantages and disadvantages of the system, and a running list of these was maintained throughout each focus group session.

C.3.2.2.1 Perceived Advantages

The table below lists the potential advantages cited by the drivers in the two focus group sessions.

Advantages Cited

North/Central Group	*South Group*
• Fewer passes.	• No need for everyone to buy passes at the end of the month.
• Faster loading.	• It is up to the customers whether they want to use a pass or cash.
• Shifts fare responsibility off driver.	• Allows faster boarding, which saves time.
• Makes it easier to transfer between different systems.	• The demonstration equipment was easy to work with.
• Passengers like it.	• Makes intersystem transfers easier.
• The card can be kept in a wallet or holder.	• Is convenient for the customers.
• The card can act as a transfer.	• Can replace paper monthly passes.
	• Customers do not need cash.
	• Can leave the card in a wallet or holder.
	• Eliminates transfers (for those customers with cards)
	• Less need for customer interaction to explain fare payment.
	• Customer can put any value or time they want on it.

It is worth noting that both groups felt that the contactless smart card allowed faster transaction processing than current payment methods, and would increase customer convenience. Specific convenience features cited included the ability to leave the card in a wallet or holder, and customer flexibility for storing the combination of pass and cash on the card that best met their needs.

Drivers noted that the card would allow transferring between systems without the need for a paper transfer.

C.3.2.2.2 Perceived Disadvantages

The table below summarizes disadvantages to a smart card fare collection system cited by the drivers in the two focus groups.

Disadvantages Cited

North/Central Group	*South Group*
• There will always be someone who won't pay - this system won't solve that. • There is potential for customer confrontation if the machine is not working, and the potential to blame the problem on the driver. • Manual exception reporting will still be required for customers using a card that isn't configured for their fare type (e.g., a child using a parents card). • There is still the potential for customers to purchase a one zone pass and travel two zones (Metro system). • Although the demonstration equipment was reliable, there is concern over the possibility of equipment malfunctioning.	• The demonstration equipment displays were not easy to view. • Drivers shouldn't need a card for log-on because they are too easy to lose and the person at the window may not hand out the correct card. Better to enter a code through the keypad. • When originally installed, the equipment shut down when the lights were turned off (this was fixed early in the project). • "Out of value" beep (of the demonstration equipment) could be embarrassing to customer. • There is still potential for fare dispute/ confrontation with customers using invalid or expired cards. • Concern over possible fragility of card. • Possibility of theft of equipment. • Customer may not remember how much they have left. • Possibility of counterfeiting.

Drivers noted that the new technology would not eliminate the potential for customer fraud (e.g., paying for one zone while traveling two zones), or the potential for fare disputes. Concern was expressed over how to deal with situations in which the equipment or card malfunctions, or a customers card has run out of value. There was consensus that the invalid transaction/out of value beep was too loud and potentially very embarrassing for customers.

C.3.3 Customer Reactions and Issues

Drivers were asked to identify customer reactions and issues to the smart card fare collection system, either based on direct experience with the demonstration project or stemming from the concept description. Overall customer reaction to the demonstration project was very positive, and comments were noted such as:

"The customers loved it."

"Faster than monthly passes."

"Better than the swipe card."

C.3.3.1 Interaction with the Demonstration Equipment

In the north/central group (where the a demonstration equipment was installed on Boeing custom bus routes) it was noted that the customers primarily worked in the high technology industry, and as such were quick to understand the function and use of the smart card.

Members of the south group noted that the demonstration did not necessarily reflect conditions that might be experienced in a full deployment, in that customers knew that they could board the coach whether or not the equipment worked by showing a companion flash pass.

C.3.3.1.1 Displays

The drivers noted that some customers checked the remaining balance display while others did not. On the passenger display unit, the most important indicator of whether a good or bad transaction had occurred was identified as being the red and green indicator lights. A few drivers noted that the passenger display unit should also include a "caution light" indicating that a card was low on funds or was about to expire.

Discussion on the usefulness of the audio tone was mixed. In the earlier discussion of advantages and disadvantages, there was general consensus that the "invalid card" audio tone was "too embarrassing for customers." That comment was reiterated by one driver from the north/central group who noted that customers with bad cards (those that had been purposely set up this way in the beginning of the demonstration) stopped using them after a few tries because of embarrassment. Other drivers however, indicated that they felt the audio tone was useful for telling them whether or not a valid fare transaction had occurred, but stipulated that it should be different than the tone from the registering farebox.

C.3.3.1.2 Other Comments

Other comments related to customer interaction with the demonstration equipment included:

- For the Pierce Seattle Express Route, some problems were encountered at the end of the month with expired passes that had not been reinitialized. These required manual clearing by the driver.

- Sometimes the customer couldn't understand where to put the card, or failed to bring the card within the required read distance. There was some discussion of whether this was a true misunderstanding of how to use the system, or a deliberate attempt by customers to "fool" the system.

- Despite the above, there was general consensus that the read distance between the reader and card was acceptable.

- There was also general consensus that the location of the reader was acceptable.

- Many customers carry their passes on neck slings, which should be considered when selecting the installation location for the reader as part of any future project.

C.3.3.2 Customer Issues Related to the Smart Card System Concept

The majority of the customer issues were identified in the discussion of the demonstration equipment. There were however, a few additional issues identified related to the overall smart card concept:

- Most drivers felt that charging $5 for the initial issuance of the card would raise questions of equity and fairness, particularly for low income customers.

- The north/central group indicated a desire to have the card transferable from an adult to a child, to allow one card to be shared. It was recognized that the card would be primarily set up one way (i.e., as an adult card), and would require manual exception reporting for a child boarding. It was generally thought that this would be acceptable as long as the exception reporting keypad was simple, and that the driver was able to visually identify whether or not the customer qualified for a discounted fare.

- It was noted that an extensive card revaluing network would be important to overall success of the program. Locations suggested included transit centers, banks and cash machines, malls, stand-alone kiosks at key locations, and park and ride locations. Possible personal security concerns at unattended revaluing location were noted, and it was suggested that such locations could accept credit and debit cards but not cash.

- The card should be accessible to everyone with no minimum revaluing level. It was noted that some customers currently cannot afford the cost of a monthly pass, and that this would provide a good option for them.

- Good customer training is essential for a successful project.

C.3.4 Additional Issues for Consideration in the Regional Project

C.3.4.1 Equipment Installation

South group drivers were of the unanimous opinion that the smart card reader should be installed on the side of the farebox, as opposed to on a grab bar or other location. The north/central group

drivers noted that the smart card equipment should be in the line of site between the driver and boarding area, and under no circumstances should be installed behind the driver.

C.3.4.1.1 Driver Display

Requirements for the driver display were discussed, and it was noted that the display should be simple and only indicate whether a card was valid or not valid. Although the reader should internally record the reason for a card being identified as "not valid", it was felt that this information should not be displayed to the driver in order to avoid potential conflicts with customers. It was also felt that customers and drivers should be able to see the same display to further help avoid the possibility of confrontation.

The drivers did not indicate a need to display balance deducted or remaining, but it was noted that both drivers and customers often check the "amount paid" display on the registering farebox.

C.3.4.1.2 Maintenance

Drivers in both groups expressed concern over possible maintenance requirements of the equipment, and impacts on operations if the equipment were to fail during a trip. With the exception of an initial installation problem (where the smart card equipment was connected to the vehicle headlights and shut down every time the lights were turned off), no failures of the demonstration equipment were noted.

C.3.4.1.3 Keypad Integration

The option of integrating keypads on the bus was discussed with mixed reaction:

- Some drivers felt it important to integrate all keypads or other log on devices together to minimize clutter in the driver area, and requirements for manually logging into equipment multiple times.

- Other drivers noted that if only one keypad were provided, it could act as a single point of failure for all onboard systems. There were also concerned about the cost of providing such global integration. Their preference was to only integrate the farebox and smart card keypads.

- The option of separating the driver display unit from the keypad was discussed, and there was general consensus that this would not be a preferred configuration. Instead, drivers in the north/central group clearly indicated that they would prefer to keep the driver display unit and keypad together, ideally fully integrating it with the farebox.

- If the transaction information is displayed on a screen, it must be long enough for the driver to read it, or should be held until the next card comes through.

- Although there was general consensus that the smart card worked faster than a swipe pass, some drivers expressed concern that it still might be slower than a flash pass.

Everett Transit drivers specifically noted that their customers liked the convenience and ease of use of a flash pass.

There was an overall sentiment that, to the extent possible, the smart card equipment should take as much burden off the driver as feasible. It was recognized though that it is very difficult to completely remove the driver from any need for manual exception recording.

C.3.5 Other Issues

During the course of the discussion, some issues were identified that were beyond the scope of the focus groups. These include:

- There was a perception amongst some drivers at the north/central group that KC Metro Transit's existing fare structure is too complicated and should be simplified. A suggestion was made to consider a one zone pricing structure.

- It was suggested that an all day pass be provided.

- A question was raised regarding the possibility of pre-paying for transit fares off the coach at heavy stops, park and ride locations, special events, transit centers, and selected stops on express routes. It was felt that this would help speed the loading and unloading process.

- The cost-effectiveness of the equipment and system benefits should be carefully considered before a decision is made to proceed with a large-scale regional initiative.

The focus group moderator noted that under the current Regional Fare Coordination System Study, the smart card would be capable of accommodating all existing fare policies. It was also noted that the card would be flexible to accommodate new policies that might be developed in the future.

C.3.6 Closing Rating

At the end of each focus group session, drivers were asked to re-evaluate the overall appeal of the smart card system on a five-point qualitative scale from poor to excellent, as shown in the table below. Overall, the responses were consistent with the original assessment with the north/central group providing an overall "good" to "very good" rating, and the south group drivers providing a solid "very good" rating.

Closing Ratings of System

	Number of Drivers Responding	
Ranking	***North/Central Group***	***South Group***
Poor		
Fair	1	
Good	3	1
Very Good	5	7
Excellent		1